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The profile of urinary proteins in TIA patients attending a Stroke Clinic in Qatar

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1. INTRODUCTION

The presence of excessive proteins in urine is considered not only an indicator of kidney damage, but also a predictor of cardiovascular disease; it also represents an overall micro-vascular damage.

2. AIMS

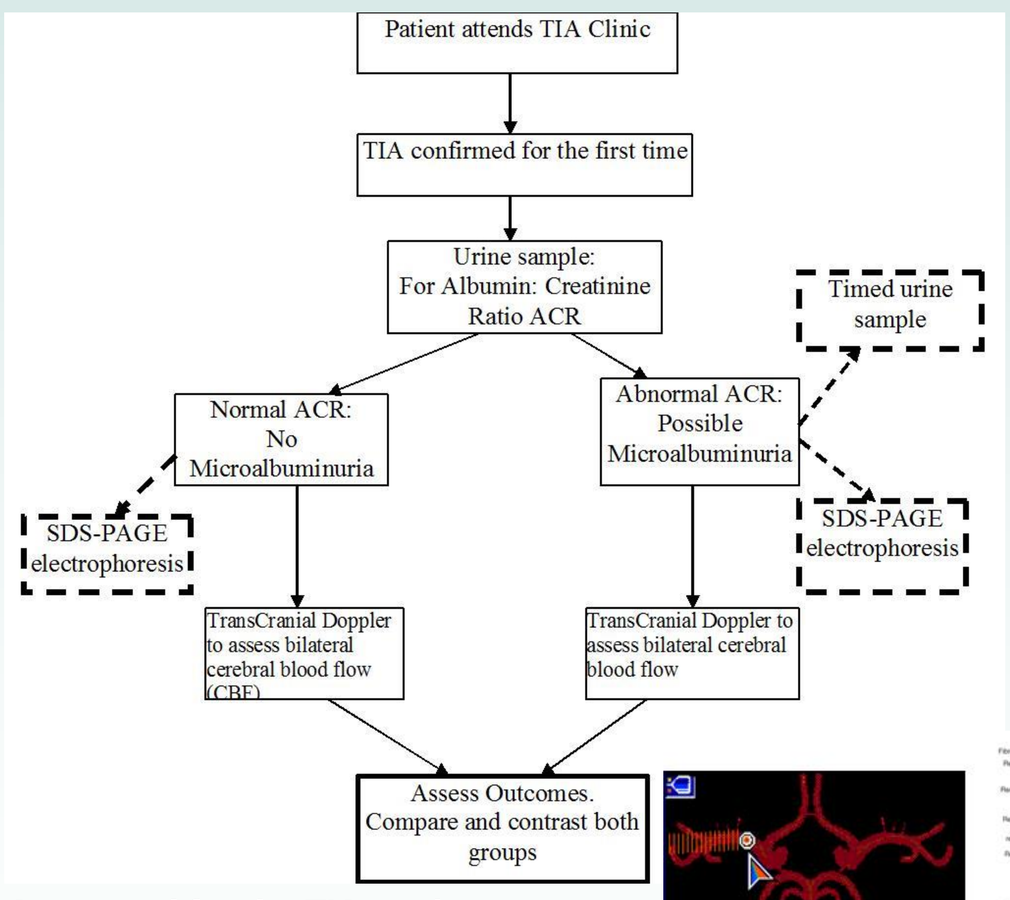
- This study aimed to investigate the relationship between microalbuminuria and TIA as part of an ongoing research project to correlate the impairment of cerebral auto-regulation with microalbuminuria in first-time TIA patients, and to assess the prognostic outcomes of such impairment (Figure 3).

3. METHODS

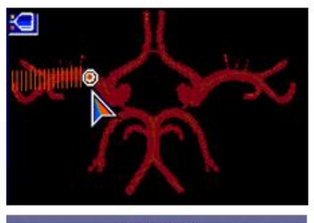
- This is a cohort study, involving 56 first-time TIA patients (mean age 55.5 years); 35M: 21F), attending a Stroke/TIA Clinic in Qatar. Microalbuminuria was first measured by calculating the Albumin/Creatinine Ratio (ACR). Urine samples (with and without microalbuminuria) were then examined using SDS-PAGE electrophoresis. Protein bands were identified by their rate of migration in comparison with standard molecular weight (MW) markers..
- 15 urine samples with microalbuminuria (30-300mg/24hr) and 12 samples with normal albumin (<30mg/24hr) were also examined (using SDS-PAGE electrophoresis).
- Protein bands were identified by their rate of migration in comparison with standard molecular weight markers.

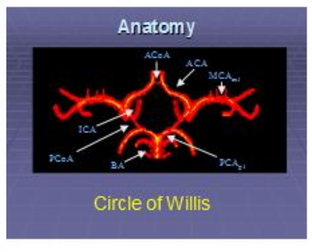
4. RESULTS

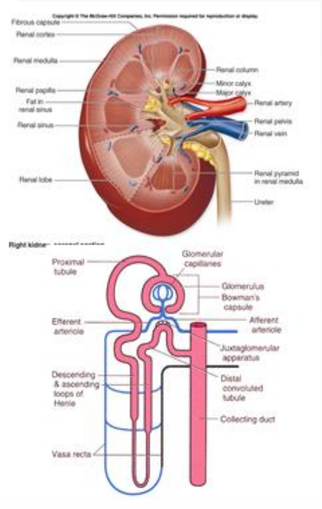
- 19 (34%) TIA patients showed evidence of microalbuminuria (30-300mg/24hr) and 38 (64%) showed normal albuminuria (<30mg/24hr). SDS-PAGE electrophoresis revealed the presence of 3 protein bands.



A protocol for the TIA study

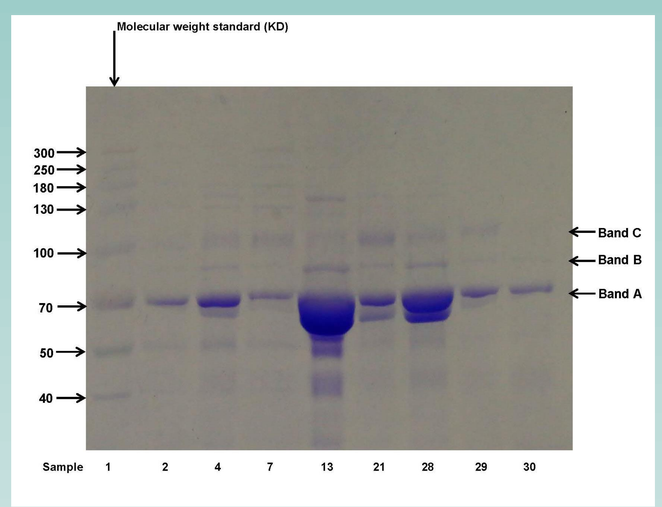




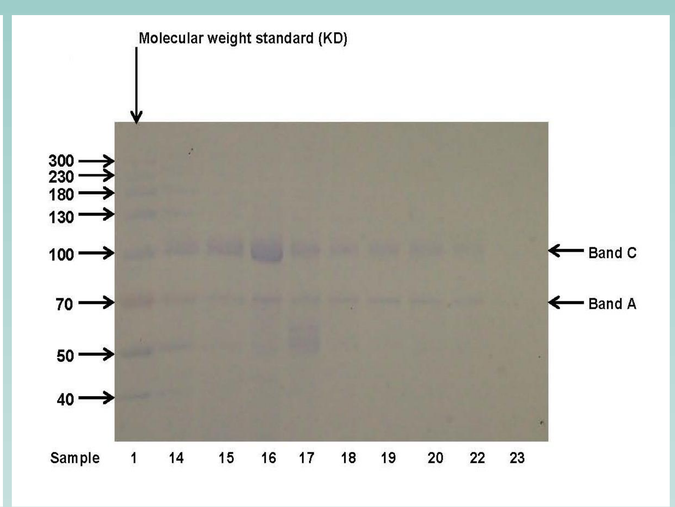


Circle of Willis and the link between cerebral blood flow and microalbuminuria in TIA patients.

- Band (A) is heavily stained, representing albumin (MW=70kDa) in patients with micro-albuminuria (Fig-1), and less intensity in patients with normal-albuminuria (Fig-2). This is supported by the biochemical assay results, which demonstrated a direct relationship between biochemical level of albumin content (measured at the hospital) and the intensity of stained band.
- Band (B) was shown in all urine samples of patients with microalbuminuria, but not in patients with normal-albuminuria. Its position on the gel is roughly equidistant between bands A and C.
- Band (C), denoting a slower migration band, representing Tamm-Horsfall protein . Tamm-Horsfall protein is suspected since not only is it the most abundant protein in urine after albumin, but also its position is in concordance with the relative molecular weight of Tamm-Horsfall protein (between 85 and 110kDa). The intensity of this band is generally not as great as band A.
- Other bands (MW<50kDa and <40kDa) were also seen; they may represent degradation products of albumin due to storage.



(Figure 1) 8% (w/v) SDS- gel electrophoresis of urine samples with micro-albuminuria;
High molecular weight standard mixture was run in lane one. *40µl of urine samples (with microalbuminuria) were run in the remaining lanes.* Three unknown protein bands were detected and labelled as A, B, and C.



(Figure 2) 8% (w/v) SDS- gel electrophoresis of urine samples– normal-albuminuria
High molecular weight standard mixture was run in lane one. *40µl of urine samples (normal albuminuria) were run in the remaining lanes.* Two unknown protein bands were detected and labelled as A, and C.

5. CONCLUSIONS

This study has just started; its outcome will enable us to answer the following questions:

- Whether there is any correlation between auto-regulation and microalbuminuria in first-time TIA patients?
- Do TIA patients with impaired cerebral auto-regulation and microalbuminuria have more vascular events than TIA patients with normal cerebral auto-regulation without microalbuminuria?
- Is there any statistically significant difference in the short-term and long-term prognosis (between the two groups)?
- Whether changes in cerebral auto-regulation can be predicted by such a simple urine test?
- Whether testing for cerebral auto-regulation (CA) in Stroke/TIA clinics will help in identifying a subgroup of TIA patients who are at grave risk of developing microvascular and macrovascular diseases, including stroke.
- Whether post TIA stroke is independently affected by impaired CA (after taking into account other confounding factors.

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